CLAIMS

I CLAIM:

1. A method of filtering a digital input signal having a digital value associated therewith, the method comprising:

determining a first rate of change of the digital input signal value relative to a previous digital output signal value;

supplying a rate adjusted digital output signal value that is (i) equivalent to the digital input signal values when the first rate of change is less than a predetermined rate magnitude and (ii) equivalent to a predetermined rate limit value when the first rate of change equals or exceeds the predetermined rate magnitude;

determining a second rate of change of the rate adjusted digital output signal value relative to a previous rate adjusted digital output signal value; and

supplying an acceleration adjusted digital output signal value that is (i) equivalent to the rate adjusted digital output signal values when the second rate of change is less than a predetermined acceleration magnitude and (ii) equivalent to the rate adjusted digital output signal values with an acceleration adjustment value subtracted therefrom when the second rate of change equals or exceeds the predetermined acceleration magnitude.

2. The method of Claim 1, wherein the step of determining the first rate of change comprises:

comparing the digital input signal value to the previous digital output signal value.

3. The method of Claim 2, wherein the step of comparing comprises:

subtracting the previous digital output signal value from the digital input signal value to obtain a first difference value.

4. The method of Claim 3, wherein the step of determining the first rate of change further comprises:

comparing the first difference value to the predetermined rate magnitude.

5. The method of Claim 1, wherein the step of determining the second rate of change comprises:

comparing the rate adjusted digital output signal value to the previous rate adjusted digital output signal value.

6. The method of Claim 5, wherein the step of comparing comprises:

subtracting the previous rate adjusted digital output signal value from the rate adjusted digital output signal value to obtain a second difference value.

7. The method of Claim 6, wherein the step of determining the second rate of change further comprises:

comparing the second difference value to the predetermined acceleration magnitude.

8. The method of Claim 6, wherein the acceleration adjustment value is set to a value that is equal to a magnitude difference between the second difference value and the predetermined acceleration magnitude.

9. A method of filtering a digital input signal having a digital value associated therewith, the method comprising:

determining a first rate of change of the digital input signal value relative to a previous digital output signal value;

supplying the digital input signal value as first stage digital output signal value when the first rate of change is less than a predetermined rate magnitude;

limiting the digital input signal value to a predetermined rate limit value and supplying the limited digital input signal value as the first stage digital output signal value when the first rate of change equals or exceeds a predetermined rate magnitude;

determining a second rate of change of the first stage digital output signal value relative to a previous first stage digital output signal value;

supplying the first stage digital output signal value as a digital output signal value when the second rate of change is less than a predetermined acceleration magnitude; and

subtracting an acceleration value from the first stage digital output signal value to obtain an acceleration limited digital signal value and supplying the acceleration limited digital signal value as the digital output signal value when the second rate of change equals or exceeds the predetermined acceleration magnitude.

10. The method of Claim 9, wherein the step of determining the first rate of change comprises:

comparing the digital input signal value to the previous digital output signal value.

11. The method of Claim 10, wherein the step of comparing comprises:

subtracting the previous digital output signal value from the digital input signal value to obtain a first difference value.

12. The method of Claim 11, wherein the step of determining the first rate of change further comprises:

comparing the first difference value to the predetermined rate magnitude.

13. The method of Claim 9, wherein the step of determining the second rate of change comprises:

comparing the first stage digital output signal value to the previous first stage digital output signal value.

14. The method of Claim 13, wherein the step of comparing comprises:

subtracting the previous first stage digital output signal value from the first stage digital output signal value to obtain a second difference value.

15. The method of Claim 14, wherein the step of determining the second rate of change further comprises:

comparing the second difference value to the predetermined acceleration magnitude.

16. The method of Claim 14, wherein the acceleration adjustment value is set to a value that is equal to a magnitude difference between the second difference value and the predetermined acceleration magnitude.

17. A method of filtering a digital input signal having a digital value associated therewith, the method comprising:

subtracting a previous digital output signal value from the digital input signal value to obtain a first rate of change of the digital input signal value relative to the previous digital output signal value;

comparing the first rate of change to a predetermined rate magnitude;

supplying a rate adjusted digital output signal value that is (i) equivalent to the digital input signal values when the first rate of change is less than the predetermined rate magnitude and (ii) equivalent to a predetermined rate limit value when the first rate of change equals or exceeds the predetermined rate magnitude;

subtracting a previous rate adjusted digital output signal value from the rate adjusted digital output signal value to obtain a second rate of change of the rate adjusted digital output signal value relative to the previous rate adjusted digital output signal value;

comparing the second rate of change to a predetermined acceleration magnitude; and

supplying an acceleration adjusted digital output signal value that is (i) equivalent to the rate adjusted digital output signal values when the second rate of change is less than the predetermined acceleration magnitude and (ii) equivalent to the rate adjusted digital output signal values with an acceleration adjustment value subtracted therefrom when the second rate of change equals or exceeds the predetermined acceleration magnitude.

18. In a filter operable to receive a present digital input signal having a digital value associated therewith and to supply a filtered digital output signal having a digital value associated therewith, a method of filtering the present digital input signal, the method comprising:

receiving the present digital input signal value;

determining a first magnitude difference between the present digital input signal value and a previous filtered digital output signal value;

comparing the first magnitude difference to a predetermined rate limit value;

supplying the present digital input signal value as a present first stage digital output signal value when the first magnitude difference is less than the predetermined rate limit value;

limiting the digital input signal value to the predetermined rate limit value and supplying the limited digital input signal value as the present first stage digital output signal value when the first magnitude difference equals or exceeds the predetermined rate limit magnitude;

determining a second magnitude difference between the present first stage digital output signal value and a previous first stage digital output signal value;

comparing the second magnitude difference to a predetermined acceleration limit value;

supplying the present first stage digital output signal value as the digital filter output signal value when the second magnitude difference is less than the predetermined acceleration limt value; and

subtracting a residual acceleration value from the present first stage digital output signal value to obtain a present acceleration limited digital signal value and supplying the present acceleration limited digital signal value as the digital filter output signal value when the second magnitude difference equals or exceeds the predetermined acceleration limit value.

19. A digital filter for filtering a digital input signal having a digital value associated therewith, comprising:

rate of change determining means for (i) determining a first rate of change of the digital input signal value relative to a previous digital output signal value and (ii) supplying a rate adjusted digital output signal value that is

(a) equivalent to the digital input signal value when the first rate of change is less than a predetermined rate magnitude, and

(b) equivalent to a predetermined rate limit value when the first rate of change equals or exceeds the predetermined rate magnitude; and

acceleration determining means for (i) determining a second rate of change of the rate adjusted digital output signal value relative to a previous rate adjusted digital output signal value and (ii) supplying an acceleration adjusted digital output signal value that is

(a) equivalent to the rate adjusted digital output signal value when the second rate of change is less than a predetermined acceleration magnitude, and

(b) equivalent to the rate adjusted digital output signal value with a residual acceleration value subtracted therefrom when the second rate of change equals or exceeds the predetermined acceleration magnitude.

20. The filter of Claim 19, wherein the rate of change determining means comprises:

first comparison means comparing the digital input signal value to the previous digital output signal value.

21. The filter of Claim 20, wherein the first comparison means comprises:

first subtraction means for subtracting the previous digital output signal value from the digital input signal value to obtain a first difference value.

22. The filter of Claim 21, wherein the rate of change determining means further comprises:

second comparison means for comparing the first difference value to the predetermined rate magnitude.

23. The filter of Claim 19, wherein the acceleration determining means comprises:

third comparison means for comparing the rate adjusted digital output signal value to the previous rate adjusted digital output signal value.

24. The filter of Claim 23, wherein the third comparison means comprises:

second subtraction means for subtracting the previous rate adjusted digital output signal value from the rate adjusted digital output signal value to obtain a second difference value.

25. The filter of Claim 24, wherein the acceleration determining means further comprises:

fourth comparison means for comparing the second difference value to the predetermined acceleration magnitude.

26. The filter of Claim 24, wherein the acceleration determining means further comprises:

third subtraction means for subtracting the second difference value from the predetermined acceleration magnitude to obtain the residual acceleration value.

27. A digital filter for filtering a digital input signal having a digital value associated therewith, comprising:

first subtraction means for subtracting the previous digital output signal value from the digital input signal value to obtain a first rate of change of the digital input signal value relative to a previous digital output signal value;

first comparison means for (i) comparing the first rate of change value to a predetermined rate magnitude and (ii) supplying a rate adjusted digital output signal value that is

(a) equivalent to the digital input signal value when the first rate of change is less than the predetermined rate magnitude, and

(b) equivalent to a predetermined rate limit value when the first rate of change equals or exceeds the predetermined rate magnitude;

second subtraction means for subtracting a previous rate adjusted digital output signal value from the rate adjusted digital output signal value to obtain a second rate of change of the rate adjusted digital output signal value relative to a previous rate adjusted digital output signal value.

fourth comparison means for (i) comparing the second rate of change to a predetermined acceleration magnitude and (ii) supplying an acceleration adjusted digital output signal value that is

(a) equivalent to the rate adjusted digital output signal value when the second rate of change is less than the predetermined acceleration magnitude, and

(b) equivalent to the rate adjusted digital output signal value with a residual acceleration value subtracted therefrom when the second rate of change equals or exceeds the predetermined acceleration magnitude.

28. A computer readable storage medium containing computer executable code for instructing a processor to filter a digital input signal having a digital value associated therewith by performing the steps of:

determining a first rate of change of the digital input signal value relative to a previous digital output signal value;

supplying a rate adjusted digital output signal value that is (i) equivalent to the digital input signal values when the first rate of change is less than a predetermined rate magnitude and (ii) equivalent to a predetermined rate limit value when the first rate of change equals or exceeds the predetermined rate magnitude;

determining a second rate of change of the rate adjusted digital output signal value relative to a previous rate adjusted digital output signal value; and

supplying an acceleration adjusted digital output signal value that is (i) equivalent to the rate adjusted digital output signal values when the second rate of change is less than a predetermined acceleration magnitude and (ii) equivalent to the rate adjusted digital output signal values with an acceleration adjustment value subtracted therefrom when the second rate of change equals or exceeds the predetermined acceleration magnitude.